Statistical Notes to *WMEAT 2005*

These notes define the country groupings and variables employed in the Statistical Tables, identify the sources of information, and explain the methods of handling data. A primary aim is to inform the reader of the main qualifications to the data, much of which is not so accurate and reliable as uniform presentation in statistical tables may seem to imply. This is particularly true of the data on military expenditures, armed forces, and arms transfers, which in many countries are subject to severe limitations of incompleteness, ambiguity, or total absence due to governmental secrecy.

WMEAT 2005 presents annual data for the 11-year period 1995-2005. Its title uses the last year covered rather than the year of publication; the latter was used to title WMEAT editions prior to WMEAT 1999-2000, the most recent previous edition.

Coverage and groups of countries

The term "***world***" in WMEAT reports refers to the sum of the countries covered. The statistical tables in *WMEAT 2005* report 1995-2005 data for 167 countries (as of 2005), including the preponderance of the 191 members of the United Nations as of 2005, as well as China -Taiwan. These countries in 2005 accounted for 99.7% of the world population of 6.48 billion (as estimated by the U.S. Census Bureau) and 99.6% of the world GDP of $45.1 trillion (as estimated by the World Bank.[1] U.N. members not covered are generally small and not considered militarily significant; relevant source data for them are frequently unavailable.[2] Subnational groups and non-state entities are not covered with respect to any variable, including military expenditures and arms transfers.

In *WMEAT 2005*, countries are grouped into normally defined ***geographical regions*** with the following exceptions and changes from previous editions:

-- The ***Middle East*** (not Africa**)** includes Egypt as before, while Turkey is moved in from Europe and Cyprus is moved out to Europe.

-- ***North America*** now includes only Canada and the United States; Mexico is in the ***Central America and Caribbean*** group, which together with ***South America*** constitutes

[1] Sources of estimates: Census Bureau -- International Database, accessed April 2009; World Bank Group – *country profiles*, drawn from the Bank's *World Development Indicators* (WDI) database for cross-country comparable data, accessed April 2009.

[2] The UN member countries as of 2005 not covered are Andorra, Antigua and Barbuda, the Bahamas, Comoros, Dominica, Grenada, Liechtenstein, Maldives, Marshall Islands, Micronesia, Monaco, Montserrat, Palau, Saint Christopher and Nevis, Saint Lucia, Saint Vincent and the Grenadines, San Marino, Seychelles, Solomon Islands, Vanuatu, and Western Samoa. Also omitted or not entered as distinct entities are: non-member countries Kiribati, Nauru, Tonga, and The Holy See; the territory with unresolved sovereignty of Western Sahara; the dependencies and areas of special sovereignty of Bermuda, Hong Kong, Macau, Puerto Rico, and many others, mainly very small islands.

Latin America.

-- ***Europe*** includes Armenia, Cyprus and Georgia, but not Turkey. ***Europe*** is divided into ***European Union*** and ***Non-E.U. Europe***, per E.U. membership at the end of 2005.

-- ***Central Asia,*** which replaces the *Central Asia and Caucasus* group employed in recent WMEAT reports, retains Azerbaijan while Armenia and Georgia move to Europe, and Afghanistan continues to be grouped with ***South Asia***.

-- ***Africa*** is divided into five regions instead of the previous four -- North, West, Central, East, and Southern, with membership similar to that in nomenclature used by the U.S. Department of State.

In each edition of WMEAT, Main Statistical Table III lists all countries in each region and the Country Rankings list all countries alphabetically.

Among **non-regional groupings**, *WMEAT 2005* discontinues the ***NATO***, (former) ***Warsaw Pact***, ***Commonwealth of Independent States***, and ***OPEC*** groupings. Also discontinued are the *developed* and *developing* country groups, which are replaced by the World Bank's country classification based on per capita income: ***high-income*** countries, divided into ***OECD members*** and ***non-OECD*** countries; ***upper-middle income*** countries; ***lower-middle income countries***; and ***low-income*** countries.[3] A country is grouped for all years covered according to the per capita income category and OECD membership status it occupied in 2005. *Caveat*: The World Bank's per capita income groups are neither equal nor even comparable with respect either to the number of people or the proportion of world income included.

Most reported data are for calendar years. For some countries, however, some source data are available only for fiscal years which diverge from calendar years. In such cases, the fiscal year which contains the most months of a given calendar year is assigned to that year; *e.g.*, source data for the fiscal year April 2002 through March 2003 would be shown under 2002 in WMEAT tables. Source data for fiscal years ending on June 30 are normally entered under the calendar year in which they end.

Definitions of indicators (or variables) and sources of data

Table I reports both military indicators -- ***military expenditures*** and ***armed forces*** -- and general indicators -- ***gross domestic product (GDP)***, ***central government***

[3] U.S. Government use of these World Bank groupings of countries by per capita income is mandated by U.S. statutes for diverse purposes, including by:
-- section 502, title V (Generalized System of Preferences [GSP]), of the Trade Act of 1974, PL 93-618, enacted Jan. 3, 1975, as amended, codified as 19 USC 2462, for purposes of determining country eligibility for GSP import preference; and
-- section 606 of the Millennium Challenge Act of 2003 (MCA), title VI of Division D of PL 108-199, the Consolidated Appropriations Act, 2004 [118 Stat. 215], enacted Jan. 23, 2004, as amended, codified as 22 USC 7705, for purposes of determining country eligibility for MCA assistance.

expenditures (CGE), and ***population***. The indicators are expressed in three ways: as **monetary values** in the case of *military expenditures*, *GDP*, and *CGE*, usually expressed in national currency terms by WMEAT's data sources but reported by WMEAT in dollar terms; as **numbers of people** for *armed forces* and *population;* and in **percentage** terms for various ratios of the military and general variables. Insofar as possible, WMEAT reports "expenditures" (military or central government) on the basis of actual outlays or disbursements, in contrast to proposed or approved budgetary allocations or "obligational authority," although source data of the latter types may be the taken into account if disbursements-basis expenditure data are unavailable.

Military Expenditures

For NATO member countries, WMEAT-reported military expenditures follow the NATO definition. In this definition, (a) civilian-type expenditures of the defense ministry are excluded and military-type expenditures of other ministries are included; (b) grant military assistance is included in the expenditures of the donor country; and (c) purchases of military equipment for credit are included at the time the debt is incurred, not at the time of payment. Both a list of NATO member countries and reports of their Defense Expenditures are accessible on the NATO website.

For most other countries, reported data are the expenditures of the ministry of defense. When these are known to include expenditures for forces specifically designed solely for internal security functions (*e.g.*, for a gendarmerie), an attempt is made to exclude them. A wide variety of data sources is used for these countries, including national sources, the publications and data resources of other US government agencies, standardized but voluntary annual national reporting to the UN via its Instrument for Reporting Military Expenditures, standardized annual "Vienna Document" reporting to the Organization for Security and Co-operation in Europe (OSCE) by OSCE member states (obligatory but not publicly available), and other international sources.

It should be recognized by users of the statistical tables that ***the military expenditure values are of uneven accuracy and completeness***. For example, there are indications or reasons to believe that the military expenditures reported by some countries consist mainly or entirely of recurring or operating expenditures and omit all or most capital expenditures, including arms purchases. In some of these cases (as indicated in the footnotes of Table I), it is believed that a better estimate of total military expenditures is obtained by adding to nominal military expenditures the value of arms imports (as shown in Table II and converted to national currency by current exchange rates). However, this method may over- or understate the actual expenditures in a given year due to the fact that payment for arms may not coincide in time with deliveries, which the data in Table II reflect. Also, arms acquisitions in some cases may be financed by, or consist of grants from other countries. Furthermore, WMEAT's estimates of military expenditures generally exclude those of armed groups distinct from any sovereign national government, *e.g.*, Hezbollah in Lebanon, the Rally for Congolese Democracy in the Democratic Republic of Congo, and the Lord's Resistance Army in Uganda.

For countries that may have major clandestine military weapons development programs, such as Iran, estimation of military expenditures is extremely difficult and especially subject to errors of underestimation.

Government practices that commonly obscure the magnitude of such expenditures include double-bookkeeping, use of extra-budgetary accounts, highly aggregated budget categories, military assistance, repression or manipulation of foreign exchange markets, and use of inoperative exchange rates for national accounting. In some cases these practices appear intended to obscure the magnitude of military spending; in other cases, they merely have that effect. Although all governments have incentives to conceal some military spending from potential foes, the more repressive of them may also have strong incentives to conceal much military spending from their own citizens, external creditors, and consumers of their exports. Casual observation suggests a broad and strong correlation across countries and over time between democratic accountability in governance and transparency of military expenditure.

Evaluating the military expenditures of some countries, such as North Korea, is made difficult by the exceptional scarcity and ambiguity of released information. In such cases, WMEAT estimates are labeled with an indicator of extraordinary uncertainty.

For ***Russia***, WMEAT's military expenditure evaluation is based in part on the analysis of Professor Julian Cooper.[4] In view of many uncertainties remaining in Russia's military spending, all known estimates remain rough

WMEAT's reported data for ***China***'s military spending are based on diverse estimates of the yuan costs of Chinese forces, weapons, programs, and activities. *WMEAT 2005* adopts an approach to valuing Chinese military expenditures that substantially increases WMEAT's estimate of China's military spending relative to its estimated national output. For example, *WMEAT 2005* estimates that China's military expenditures were equivalent in 1999 to 4.3% of GDP, rather than to 2.3% of GNP as estimated by *WMEAT 1999-2000*. On the other hand, the dollar values of China's military expenditures are markedly lower in WMEAT 2005 than in previous editions of WMEAT due to the use of market exchange rates instead of purchasing power parities (PPP) for converting into dollars the national currencies of 32 countries including China; see "Consistent use of market exchange rates rather than purchasing power parities," below. This reduces China's GDP, CGE and military spending in dollar terms by a large proportion, due in part to undervaluation of China's currency relative to the U.S. dollar. As these considerations indicate, WMEAT's estimates of China's military spending (like those from other sources) should be treated as having a wide margin of error.

[4] Julian Cooper, "The military expenditures of the USSR and the Russian Federation, 1987-97", in *SIPRI Yearbook 1998*, Stockholm International Peace Research Institute, 1998, pp.243-259. Rough estimates were made to supplement the Cooper estimates where recognized gaps were left unfilled.

Other published sources used to evaluate military spending include the *Government Finance Statistics* issued by the International Monetary Fund (*IMF/GFS*) in both electronic and hard-copy yearbook form; *The World Factbook*, produced annually by the U.S. Central Intelligence Agency; the *SIPRI Yearbook: World Armaments and Disarmament*, issued annually by the Stockholm International Peace Research Institute; and *The Military Balance*, issued annually by the International Institute for Strategic Studies (London).

Gross Domestic Product (GDP)

In *WMEAT 2005*, gross domestic product (GDP) replaces gross national product (GNP), used by previous WMEAT reports, as the measure of national output. The source of GDP data for most countries is The World Bank, which provides GDP estimates in both current and constant national currency terms.[5] Whereas GNP measures the final value of market-traded goods and services produced by the nationals of a country, regardless of the physical location of that production, GDP measures the final value of market-traded goods and services produced within the territory of a country, regardless of the nationality of the firms or individuals engaged in their production. The global sum of national GDPs should equal the global sum of national GNPs.

For countries that are not members of the World Bank or have not reported GDP data to the World Bank, GDP values (sometimes in dollar terms) are sourced from diverse sources including the national accounts page of the website of the U.N. Statistics Division and the country profiles of the *Economist Intelligence Unit (EIU).*

Central Government Expenditures (CGE)

These expenditures include current and capital (developmental) expenditures plus net lending to government enterprises by central (or federal) governments. A major source is the IMF's *Government Finance Statistics Yearbook* (*IMF/GFS-Y*). The category used here is "Outlays by function of government, Central Government."[6]

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[5] Constant-price GNP is no longer available from the World Bank, which is WMEAT's principal source of national product data for most countries. GDP is increasingly used instead of GNP in international economics; the country in which production occurs tends to be more readily identifiable than the nationality of all individuals contributing to it.

[6] In the current electronic form of the IMF's *Government Financial Statistics* (*IMF/GFS-E*), the entry used is called "Consolidated Government, Total Outlays." For years prior to 2000, the entry was called "Total Expenditures and Lending minus Repayment, Consolidated Central Government." In 2001, the IMF revised its method of government finance accounting. This revision causes *IFM/GFS-Y* and WMEAT estimates of CGE for most countries for years before 2000 to be not fully comparable to CGE estimates for 2000 and later years. This revision resulted in non-coverage of some years between 1998 and 2001 for some countries in the hard-copy (*Yearbook*) form of *IMF/GFS*. Since the Department of State also lacks access to *IMF/GFS-E* for some high-income countries, this revision also causes *WMEAT 2005* to estimate by interpolation CGE for some high-income countries for some of these years; to such estimates by

Sources of CGE values for countries not covered by (or for lacunae in) *IMF/GFS* include the *International Financial Statistics* published by the IMF *(IMF/IFS)*, the country *Economic Surveys* of the Organisation for Economic Co-operation and Development (OECD), the country profiles of the *EIU*, and the CIA's annual *World Factbook*.[7]

For some countries, including ***China*** and ***Iran,*** WMEAT's ratio of military expenditures to central government expenditures may be overstated because CGE may be understated, inasmuch as the estimate for military expenditures is obtained at least in part independently of nominal budget or government expenditure data, and it is possible that not all estimated military expenditures pass through the nominal central government budget.

The magnitude of CGE relative to GDP varies substantially across countries with comparable GDP per capita, due to differences not only in the extent to which such services as higher education, health care, and retirement pensions are provided by government, but also in the extent to which government is federally decentralized. To assist readers in interpreting this ratio, WMEAT reports include a single-year table and ranking countries by CGE/GDP (or, in the past editions, CGE/GNP) ratios. Cross-country comparisons of military spending as a share of CGE can be misleading unless informed by awareness both of cross-country differences in CGE as a share of GDP and of the reasons for such differences.[8]

Population

Population figures are for midyear and are taken from the International Database (IDB) of the U.S. Bureau of the Census as of March 2009; due to periodic updates of the IDB, population figures in any given edition of WMEAT may differ from IDB figures currently online.

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interpolation, for example, for the CGE of the United Kingdom for 2001, an "E" indicating unusual uncertainty is appended.

[7] Although the *World Factbook* commonly estimates CGE on a purchasing power parity (PPP) basis, it generally uses the currency conversion rate implied by PPP for GDP to derive a PPP-basis estimate of CGE. Consequently, a ratio of GDP to CGE obtained from *World Factbook* estimates of both in PPP terms can be used to derive an estimate of CGE at any exchange rate from an exogenously given estimate of GDP at the same rate.

[8] For example, in 2005, U.S. military expenditures, although equivalent to only 4.1% of GDP, constituted 19.0% of CGE, whereas U.K. military expenditures, although equivalent to 2.5% of GDP, constituted only 5.6% of CGE. This is because the government of the U.K. both is less decentralized than that of the U.S. and provides a broader range of social welfare services.

Armed Forces

Armed forces figures enumerate active-duty military personnel, including paramilitary if those forces resemble regular units in their organization, equipment, training, or mission. Reserve forces are not included unless specifically noted.

Figures for the ***United States*** and all other NATO member countries are as reported by NATO; they are publicly accessible on the Defense Expenditures page of the NATO website. Estimates of the number of personnel under arms for other countries are based on a variety of US Government and other sources, including *Jane's World Armies* and the IISS's *Military Balance*.

Arms Transfers

Arms transfers (arms imports and exports), described by Main Statistical Tables II, III and IV, represent the international transfer (under terms of grant, credit, barter or cash) of military equipment and related services, including weapons of war, parts thereof, ammunition, support equipment, and other commodities designed for military use, as well as related services. Among the items included are tactical guided missiles and rockets, military aircraft, naval vessels, armored and non-armored military vehicles, communications and electronic equipment, artillery, infantry weapons, small arms, ammunition, other ordnance, parachutes, and uniforms. (There have been no known international transfers of purely strategic weaponry other than US Trident missile sales to the U.K.) Dual use equipment, which can have application in both military and civilian sectors, is included when its primary mission is identified as military. The building of defense production facilities and licensing fees paid as royalties for the production of military equipment, as well as equipment delivery, maintenance, operating and training services, are included when they are contained in military transfer agreements. Military services such as training, supply, operations, equipment maintenance or repair, technical assistance, and construction are included where data are available.[9] Excluded are foodstuffs, medical equipment, petroleum products and other supplies.

The arms imports and exports statistics contained in Main Tables II and III and the "Deliveries" portion of Table IV are estimates of the value of goods actually delivered during the reference year(s), in contrast both to payments and to the value of programs, agreements, contracts or orders concluded during the reference year(s). However, summary data on arms transfer agreements are presented in Table IV. Both deliveries and agreements data represent arms transfers only to governments or to entities (typically enterprises) authorized by their countries' governments to receive them.

[9] Services appear to constitute a recently growing and now double-digit albeit uncertain minority percentage of the total value of global arms transfers. The services component of arms transfers seems particularly large in conjunction with transfers of technically sophisticated and complex equipment, especially to less developed countries.

U.S. arms exports in WMEAT accounts include private enterprise-to-government or enterprise-to-enterprise exports under the Direct Commercial Sales (DCS) program administered by the Directorate of Defense Trade Controls (DDTC) in the Bureau of Political-Military Affairs of the U.S. Department of State, pursuant to section 38 of the Arms Export Control Act, as amended (codified as 22 USC 2778) as well as government-to-government transfers under programs administered by the Department of Defense (DOD), including: Foreign Military Sales (FMS) including Foreign Military Construction Sales (FMCS), Drawdowns of non-excess DoD equipment stocks (Drawdowns), transfers of Excess Defense Articles (EDA), the Military Assistance Program (MAP), and International Military Education and Training (IMET),[10] all administered by DoD's Defense Security Cooperation Agency (DSCA); and Ship Transfers, administered by the U.S. Navy through its Program Executive Office, Ships (PEOS), the Security Assistance Directorate of its International Programs Office (IPO), and the Ship Transfer Program Office of its Naval Sea Systems Command (NAVSEA).

For years since 1996, principal sources for the value of U.S. arms exports, by year and country of destination, include three distinct annual publications, all published pursuant to Section 655 of the Foreign Assistance Act, as amended (in 1996), codified at 22 USC 2415:
-- DDTC's "Section 655 Report," published on the reports page of DDTC's website. These reports, prior to that for FY 2008, provide the value of only of arms exports licensed by DDTC, which WMEAT adds into its values for U.S. arms export "agreements" in Table IV; the report for FY 2008 also provides the value of shipments (deliveries) of arms exports under the DCS program.
-- The Department of State's annual *Congressional Budget Justification for Foreign Operations* (CBJFO), typically in "Supporting Information" included in or appended to Part III, has provided, for years prior to 2007, the value of shipments (deliveries) under DDTC's DCS program.
-- The *DSCA Facts Book*, also known as the *DSCA Historical Factsbook*, published by DoD/DSCA, of which the most recent edition has been accessible on the publications page of DSCA's website, and of which editions for past years have been made publicly available by the Arms Sales Monitoring Project of the Federation of American Scientists (FAS/ASMP), on the "U.S. Arms Transfers: Government Data" page of the FAS website. The *DSCA Facts Book* has provided both agreements and deliveries data for exports under FMS and FMCS, EDA under MAP, other MAP including MAP drawdowns, and IMET. However, DSCA has stated in the notes to FactBooks that DoD considers IMET fully delivered when it is funded; for this program, no distinction is made between the two categories of accounting.

In addition, FAS/ASMP has published annually, on the "U.S. Arms Transfers: Government Data" page of the FAS website, portions of DoD/DSCA's "Section 655 Report" that include an informative accounting of authorizations of Drawdowns and EDA but have not been published elsewhere. This edition of WMEAT adds these EDA and Drawdown authorizations into U.S. arms exports agreements for Table IV, and

[10] Part of the IMET program is devoted to programs that promote improved civil-military relations.

estimates deliveries of EDA as equal to EDA authorizations and deliveries of Drawdowns as equal to the average of the previous three years' Drawdowns authorizations.

Data for the value of U.S. ship transfer agreements and deliveries, not known to be published, are obtained from NAVSEA's Ship Transfer Program Office.

In this edition of WMEAT, values for U.S. arms exports are for fiscal years as reported by the Department of State or of Defense as described above. In Table IV, values for U.S. arms export agreements have the same scope of coverage as deliveries values, with one exception: whereas DDTC license authorizations data, added into WMEAT's estimates of U.S. arms exports agreements, exclude exports under the DCS program but exempt from licensing requirements, WMEAT (unpublished) estimates of deliveries under the DCS program, added into WMEAT's published estimates of U.S. arms export deliveries, may include shipments under the DCS program permitted by exemptions rather than by licenses.

The terms on which the non-services components of U.S. arms exports are valued (*e.g*., FAS, FOB or CIF) are not known to be consistent across the above-listed programs.

This edition of WMEAT substantially revises, upward, WMEAT's published estimates of the values both of total U.S. arms export deliveries and of world arms transfers delivered, due to an equivalent upward revision of WMEAT's estimate of the value of private U.S. arms exports under the DCS program. Recent prior editions of WMEAT, starting with *WMEAT 1997*, offered estimates of U.S. arms export deliveries based on an estimation that the value of arms export deliveries under the DCS program had been equal to 50% of a weighted-average annual value of DCS export licenses approved by DDTC over a term of prior years equal to the length of a license. That method of estimating the value of deliveries U.S. arms exports under the DCS program was adopted in *WMEAT 1997* due to incomplete reporting of DCS export deliveries. However, the quality of reporting on private arms export deliveries under the DCS program has improved markedly for recent years starting with 2005.[11] In estimating the value of all U.S. arms export deliveries for 2005, this edition of WMEAT uses the value of DCS export deliveries for 2005 published by DDTC, based on greatly improved reporting on DCS shipments. In estimating the value of all U.S. arms export deliveries for years prior to 2005, this edition of WMEAT estimates the value of DCS arms export deliveries as 100% of a weighted-average annual value of DCS export licenses approved by DDTC over a term of prior years equal to the length of a license.[12]

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[11] This improvement results from a requirement that all exporters under the DCS program report export shipments to the Census Bureau's Foreign Trade Division using the Automated Export System (AES) of the Customs Service. That requirement was enacted on September 30, 2002, in section 1404 of the Security Assistance Act of 2002, Division B of the Foreign Relations Authorization Act, Fiscal Year 2003 (Publ. L. 107-228, at 116 STAT. 1454**).** DDTC implemented this requirement by amendments to CFR 120, 123, 124 and 125, sections of the International Traffic in Arms Regulations (ITAR), that were published as a final rule in The Federal Register of October 27, 2003 (68 FR 61098).

[12] Since the term of DDTC licenses to export defense articles (goods) is five years, WMEAT now estimates the value of export deliveries of defense articles under the DCS program for any year before 2005 as a

Due to this upward revision of the value of deliveries of U.S. arms exports under the DCS program, WMEAT's estimate of the value of U.S. arms export deliveries in 1999, the most recent year covered by a prior WMEAT report, rises by 47%, from the $33.0 billion published in *WMEAT 1999-2000* to the $48.6 billion published in this edition of WMEAT. For the same reason, WMEAT's estimate of the U.S. share of world arms export deliveries in 1999 rises from 64% to 69.4%.[13]

Even in *WMEAT 1999-2000*, WMEAT's estimates of U.S. arms export deliveries were markedly higher, both in dollar terms and as a share of the world arms market, than the estimates published elsewhere, including in SIPRI's estimate of the financial value of states' arms exports (which are separate and distinct from the trend indicator value figures produced by the SIPRI Arms Transfers Database), in IISS' *The Military Balance*, and in the "Conventional Arms Transfers to Developing Nations" (CATDN) report produced annually by the Congressional Research Service (CRS).[14] SIPRI, IISS, and CRS estimated the average annual U.S. share of world arms export deliveries during 1995-99 at between 40% and 50%, whereas *WMEAT 1999-2000* indicated that it was over 56%.

The difference between U.S. arms export deliveries as reported in this edition of WMEAT and in the most recent SIPRI, IISS, and CRS reports is still more striking. The average annual value of U.S. arms export deliveries during 2001-05 appears six times greater in this edition of WMEAT than in the latest SIPRI, IISS, and CRS/CATDN reports. SIPRI, IISS, and CRS/CATDN all show the average annual value of U.S. arms export deliveries as having declined, even in current dollar terms, from about $15 billion during 1995-99 to about $11 billion during 2001-05; *WMEAT 2005* shows it as having increased in current dollar terms from just over $42 billion during 1995-99 to nearly $64

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weighted average of 100% of the value of DDTC-reported DCS license approvals of the reference year and the prior four years; that weighting assumes an inverse relationship between the value of shipments and time since license approval. Given that the term of DDTC licenses to export defense services is ten years, WMEAT now estimates the value of export deliveries of defense services under the DCS program, insofar as data permits, as a weighted average of 100% of the value of DDTC-reported DCS license approvals over the reference year and the previous nine (9) years; that weighting assumes an inverse relationship between the value of shipments and time since license approval. However, since DDTC did not publish and WMEAT therefore lacks data on DCS service licensing approvals as a separate category for years before 1996, WMEAT is forced to truncate the number of years over which we average for years before 2005, *e.g.*, 9 years for 2004, 8 years for 2003, *etc*.

[13] As the GAO observed in a September 2010 report, GAO-10-918, DTC accounting may overstate US arms export deliveries under the DSC program for years since 2005 both by including some shipments to U.S. armed forces overseas and some double-counting. However, the magnitude of this overstatement seems likely to be proportionally far smaller globally and usually than for the Persian Gulf states during US combat operations in Iraq, the sample considered by that GAO report. Consequently, although estimates of the value of US arms exports may tend to be overstated in *WMEAT 2005*, any such overstatement seems likely to be much less than the understatement of the value of US arms exports now apparent in previous editions of WMEAT.

[14] CRS/CATDN reports for recent years are accessible both on the CRS reports page, maintained by the Foreign Press Center, of the website of the U.S. Department of State, and on the "U.S. Arms Transfers: Government Data" page, maintained by FAS/ASMP, of the FAS website

billion during 2001-05. Whereas SIPRI, IISS, and CRS/CATDN all show the average annual U.S. share of world arms export deliveries as having declined from at least 40% during 1995-99 to below 35% during 2001-05, this edition of WMEAT implies that it rose from over 65% during 1995-99 to more than 75% during 2001-05.

These differences result chiefly from differences in estimating the value of the DCS component of U.S. arms export deliveries, which, by *WMEAT 2005*'s estimate, have increased substantially both in dollar terms and as a share of total U.S. arms export deliveries. [15] In recent years, SIPRI and IISS have sourced their estimates for the financial value of U.S. arms exports from the CRS' CATDN report. CATDN reports published before 2006 used DDTC's published estimates of arms export shipments under the DCS program in estimating the value of U.S. arms exports, while noting that exports under the DCS program were incompletely reported. CATDN reports published since 2006 have excluded altogether exports under the DCS program from their U.S. arms export accounts. Thus, CATDN estimates of U.S. arms export deliveries have been based in part on valuing exports under the DCS program at amounts equivalent to less than 20% of DCS export license approvals in reports published before 2006, and at zero in reports since 2006. Meanwhile, WMEAT's estimates of U.S. arms export deliveries have been based in part on valuing exports under the DCS program at 50% of DCS license approvals in previous editions since 1997, and at 100% of DCS license approvals in this edition of WMEAT. Consequently, WMEAT and CATDN estimates of the value of DCS export deliveries have diverged widely and increasingly.

US arms imports in WMEAT accounts include (a) imports of military-type goods, data for which are obtained from the Foreign Trade Division of the Census Bureau of the Department of Commerce (Census/FTD), and (b) Department of Defense direct expenditures abroad for major equipment, data for which are obtained from the Balance of Payments Division of the Commerce Department's Bureau of Economic Analysis, which compiles such data from DOD sources.

The goods in (a) are those in Census FTD's "Import End Use Categories 50000 and 50010," and include: complete military aircraft and parts; engines and turbines for military aircraft; military trucks, armored vehicles, *etc*.; military (naval) ships and boats; tanks, artillery, missiles, guns, and ammunition; military apparel and footwear; and other military goods, equipment and parts. Data for such U.S. military imports for the five most recent years and for specific countries of origin have been publicly accessible on the "U.S. Imports by 5-digit End Use Code" page of the website of the Census Bureau. These import End Use Category data are in terms of customs value for general imports.

WMEAT's values for **arms imports and exports for countries other than the United States** are estimates by U.S. Government sources, provided in current U.S. dollar

[15] As the U.S. Government Accountability Office (GAO) observed in a September 2010 report, GAO 10-952, most US exports of defense articles (goods), by value, during 2005-2009 now appear to have been commercial shipments under the DCS program.

terms. The merchandise components of these data are understood generally to be valued in FAS rather than CIF terms.

Potential systematic biases in WMEAT's valuation of arms transfers involving the US relative to other arms transfer seem diverse in their causes and effects. Differences in sourcing arms trade data for the U.S. and for the rest of the world may render WMEAT's coverage of US arms exports and imports more complete than its coverage of arms exports and imports from many other countries; hence WMEAT may tend to overvalue US arms exports and imports relative to arms transfers not involving the US. In *WMEAT 2005*, US arms exports, may tend further to be overvalued both in absolute terms and relative to arms exports of other countries, due to implicit upward revaluation of the DCS component of US arms exports based on newly available reporting which, although it seems generally an improvement, is known to include some double-counting and some shipments to US armed forces in other countries. On the other hand, the services share of arms exports is thought to be greatest in the exports of the nations with the most advanced military technologies, notably including the U.S., and it is harder to observe trade in services than trade in goods, in the defense sector as in all sectors; this may cause WMEAT to tend to undervalue the arms exports of the US relative to those of other countries.

Especially for arms transfers not involving the US, arms transfer values for the most recent years covered by an edition of WMEAT tend to be understated relative to values for prior years covered. Information on arms transfers comes from a variety of sources and is sometimes acquired and processed with a considerable time lag. In Main Statistical Tables II, III and IV, data for the most recent years covered therefore are likely than data for earlier years to undergo some upward revision in succeeding editions of WMEAT.

Close comparisons between the estimated values shown for arms transfers and for GDP and military expenditures are not warranted. Frequently weapons prices do not reflect true production costs. Furthermore, much of the international arms trade involves offset or barter arrangements, multiyear loans, discounted prices, third party payments, and partial debt forgiveness. Acquisition of armaments thus need not impose the burden on an economy, whether in the same year or in other years, that is implied by the estimated U.S. dollar value of the shipment. Therefore, the value of arms imports should be compared to other categories of data with care.

Total Imports and Exports

In this edition of WMEAT, unlike previous editions, the values for total imports and exports, found in Main Statistical Table II, include not only merchandise but all goods and services, in order to render "total imports" more comparable with "arms transfers," which appear increasingly to consist of services as well as goods. The values for imports and exports of goods and services, by country and year, are sourced from the time series data of the World Bank's World Development Indicators (WDI) Database as

of September 2009. The WDI Database provides them in current U.S. dollar terms. The merchandise trade component is understood to be calculated in CIF terms for imports and in FAS terms for exports.

The World Bank provides no data for goods and services imports or exports for some years for some countries, due to lack of reporting to the World Bank by those countries' governments of data consistent with World Bank quality requirements. In this edition of WMEAT, with rare exceptions indicated in the notes to Table II, no effort has been made to estimate total imports or exports for countries and years for which the World Bank provides no data. Such countries and years are entered as zeros in summing country entries to yield entries for geographic and economic groups in Table II. Consequently, total imports or exports may be understated, both absolutely and relative to arms imports or exports, for any geographic and economic group, to an extent varying with non-reportage of goods and services trade data to the World Bank by governments of countries in that group. Such non-reportage tends to be concentrated in countries with low per capita incomes and limited governmental transparency and accountability.[16]

Consistent use of market exchange rates rather than purchasing power parity for converting other currencies to U.S. dollars

WMEAT's Table I reports values for GDP, CGE and military expenditures in U.S. dollar terms for all countries. Source data, however, are expressed in the national currency terms for nearly all countries in the case of GDP and CGE, and for most countries in the case of military expenditures. For a given country and year, conversion from national currency to dollars is at the same rate for all three indicators; consequently, the ratio of any two of these indicators remains the same in dollars as in national currency.

WMEAT 2005 has discontinued the practice, which prior editions have applied to some countries, of using the conversion rate based on the purchasing power parity (PPP) rate for GNP as a whole to convert to U.S. dollars all evaluations made in national currency terms. Insofar as possible, *WMEAT 2005* uses year-average market exchange rates to convert into U.S. dollars all values of GDP, GGE or military expenditures based on data expressed in national currency terms. These market exchange rates are obtained either from the World Bank Group or from the International Monetary Fund (IMF) and generally are the "rf" exchange rate published in the *IMF/IFS*. Such year-average market exchange rates are used for all countries for which they are available and in which there

[16] Reliable data for merchandise trade are available for more countries and years than are reliable data for trade in goods and services. Future editions of WMEAT may estimate goods and services trade for some countries based in part on available merchandise trade data, in order to reduce the magnitude of omissions resulting from the absence of data for goods and services trade data. However, that has not been done in this edition of WMEAT.

is a single exchange rate, regardless of the extent to which government may repress or manipulate foreign exchange markets.[17]

However, for some countries covered by WMEAT, exchange rate data is not available from either the World Bank or the IMF, either because they are not members of those institutions (*e.g.*, Cuba and North Korea) or because, although members, they have not reported economic data for the period covered to those institutions (*e.g.*, Somalia). Exchange rate data for such countries are drawn from other sources, including the country profiles of the *EIU*. Some countries, such as Burma and Cuba, still have multiple exchange rates; for some such countries, no well-founded estimate of what a single free market exchange rate might is known.

Recent previous editions of WMEAT used conversion at the PPP-for-GNP rate to express in terms of U.S. dollars values of GNP, CGE and military expenditure for the following 32 countries covered by WMEAT 2005: Angola, Armenia, Azerbaijan, Belarus, Bulgaria, Burma, Cambodia, China (mainland), Democratic Republic of Congo, Croatia, Czech Republic, Estonia, Georgia, Hungary, Kazakhstan, North Korea, Kyrgyzstan, Latvia, Lithuania, Macedonia, Moldova, Poland, Romania, Russia, Serbia and Montenegro, Slovakia, Slovenia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan and Vietnam.[18] For these countries, *WMEAT 2005* values of GDP, CGE and military expenditure are not comparable to the GNP, CGE and military expenditure values in prior editions of WMEAT.

Since all 32 of these countries are poorer than the U.S., the change from conversion at PPP rates to conversion using market exchange rates tends to lower WMEAT values of GDP, CGE and military spending in dollar terms. The proportion of this reduction tends to decrease with a country's per capita income and to increase with undervaluation of the national currency; for both reasons, this reduction is large in the case of ***China***. Consequently, in *WMEAT 2005*, estimates of GDP, CGE and military spending of China and Russia are much smaller relative to those for the U.S. and high-income U.S. allies than in previous WMEATs. However, the change from conversion at PPP rates to conversion using market exchange rates does not affect WMEAT estimates of military expenditure as a proportion of GDP or of CGE for any country. WMEAT's change from conversion at PPP rates to conversion using market exchange rates for the above-listed 32 countries, including China and Russia, also tends to lower WMEAT estimates of GDP, CGE and military expenditure values for Europe, East Asia and Central Asia, and for the world.

To evaluate GNP, CGE and military spending for non-market economies by converting currencies at rates implied by PPP for GNP, and to compare such values to values for market economies obtained by conversions at market exchange rates, was a

[17] A summary overview of national exchange rate regimes is provided by the IMF's Classification of Exchange Rates and Monetary Arrangements.

[18] Prior WMEAT editions also used PPP conversion rates to express in dollar terms the GNP, CGE and military expenditure of Czechoslovakia, East Germany, and the Soviet Union.

practical albeit inelegant expedient during the Cold War. However, the subsequent spread of market-based economies including unified market exchange rate regimes has made it possible -- without resorting to the methodologically problematic expedient of converting a country's military expenditure at the rate implied by PPP for its whole economy -- to achieve greater consistency across countries in methods of converting into U.S. dollars military spending source data denominated in other currencies. This approach to the conversion rate problem is imperfect; nevertheless, it seems better than continuing to convert some currencies at a market exchange rate and others at a PPP rate.

Rates used in converting GDP, CGE and military spending to US dollars

WMEAT values GDP, CGE and military expenditure data in a way that facilitates identification of trends over the 11-year period covered by a WMEAT edition.[19] To avoid distortion of such trends, WMEAT, for ten of the 11 years covered in an edition, converts GDP, CGE and military expenditures of any country other than the U.S. into U.S. dollar terms at rates that eliminate exchange rate fluctuations other than those necessary and sufficient to offset differences between the U.S. and the other country in aggregate price inflation relative to a base year; only for that base year is an observed or estimated market exchange rate used without adjustment for changes in relative aggregate prices. As a result, ***WMEAT's current- and constant-dollar expressions of non-base-year values originally denominated in another currency differ, sometimes by substantial magnitudes, from values derived using a distinct exchange rate observed or estimated for each of the eleven years covered***.[20]

Use of inflation-differential-offsetting (or "real") conversion rates

In WMEAT, as per convention, foreign-currency-denominated values are expressed in current-dollar terms by converting the foreign-currency-denominated value for each year by an exchange rate specific to that year. However, in WMEAT, the conversion rate used is an observed rate or independently estimated exchange rate (for most countries, the market exchange rate) only for the most recent year covered, or "base year" (2005 in this edition).[21] For each prior year, WMEAT in effect constructs a conversion rate specific to that year that adjusts the exchange rate of the base year by the

[19] Since its inception in the 1960s, WMEAT has focused on trends in both military expenditures and arms transfers. Since 1994, section 404 of PL 87-297, the Arms Control and Disarmament Act, codified as 22 USC 2593b, has required that WMEAT highlight trends in arms transfers.

[20] This caveat applies only to WMEAT's estimates of GDP, CGE and military expenditure, not to WMEAT's values for imports and exports either of all goods and services or of arms, the raw data for which are obtained already expressed in dollar terms.

[21] The most recent year covered is used as the base year because in recent decades a global trend toward exchange rate liberalization has tended to make market exchange rates more readily available and more continuous over time.

ratio of the inflation rates between the U.S. and the other country, as measured by the GDP deflators for the two countries, between the year in question and the based year.[22] That is, WMEAT uses what economic literature calls "real exchange rates."[23] Thus, if aggregate price inflation between the base year and a previous year were 5% for the U.S. and 10% for country X, then the WMEAT would in effect convert values for the year prior to the base year from country X's currency into what WMEAT calls "current dollars" at a rate that values dollars 100((1.10/1.05) -1)% less relative to country X's currency than did the observed exchange rate in the base year.[24]

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[22] In the case of a multinational currency zone, like the E.U., the inflation rate used to generate the inflation-differential-offsetting (IDO) conversion rate for each E.U. member nation is the national inflation rate, hence the IDO rate varies across E.U. member countries. Similarly, for a country that has "dollarized" either by using the U.S. dollar instead of a national currency or by pegging its currency to the dollar, the inflation rate used to generate the IDO rate for that country is its inflation rate, not the U.S. inflation rate.

[23] *Caveat*: In a single-currency context, "real dollars" is widely used as a synonym for "constant dollars," meaning "inflation-discounted" as opposed to "nominal" or "current" dollars. However, in a multiple-currency context, converting a time series of other-currency-denominated values to dollars at "real exchange rates" does not yield what is commonly meant by "real" or "constant" dollars.

[24] The actual computation process used to generate what WMEAT calls "current dollar" and "constant dollars" estimates, which is mathematically equivalent to generating such inflation-differential-offsetting conversion rates, consists of three steps:

a) WMEAT estimates for a country's GDP, CGE and military spending, which for most countries are expressed originally in the national currency and at current prices, are "deflated" or put into constant-price terms, usually by means of the country's implicit deflator for GNP as a whole. By this means, estimates in national currency terms for years other than the most recent are re-expressed in prices of the most recent year covered.

b) These estimates are then divided by the average exchange rate in the most recent year covered between the national currency and the US dollar and thus converted into constant base-year (2005) dollars.

c) Data in constant dollars are then expressed in what WMEAT tables call "current" dollars by multiplying by the US implicit GNP deflator.

The calculation may be illustrated by an example, assuming the following data:

1995 national military expenditures, in national currency at current (1995) prices.....4,600

1995 implicit GNP deflators (2005 = 100):
National.....55.5
US.....79.6

2005 exchange rate, national currency units per dollar.....15.92

Then, 1995 national military expenditures:

In constant 2005 dollars = 4,600/.555/15.92 = 520.6
In current (1995) dollars = 520.6 x .796 = 414.4

WMEAT in effect generates its constant collar values of GDP, CGE and military spending for years prior to the most recent year covered by reflating what it calls its "current dollar" values by the U.S. GDP deflator, derived from the current and real ("chained dollars") U.S. GDP statistics published by the U.S. Bureau of Economic Analysis (BEA). This is the conventional way of deriving constant dollar values from current dollar values; however, because WMEAT's use of inflation-differential-offsetting (or "real") conversion rates for non-base years makes WMEAT's current dollar values differ from values at market exchange rates observed for those years, WMEAT's constant dollar values also differ from the constant dollar values that would be obtained by price-deflating values at market exchange rates observed for those years.

GDP price indices are applied also to military and central government expenditures because price indices specifically for those sectors are not available for many countries; however, the use in this report of the same rate for converting all variables from national currencies to US dollars means that the relationships among those variables in national currency terms remain the same when those variables are expressed in dollars.

Exception: For a number of countries in which GDP is dominated by oil exports (**Bahrain, Kuwait, Libya, Oman, Qatar, Saudi Arabia, and the United Arab Emirates**), WMEAT has used, and this edition of WMEAT continues to use, the implicit price deflator for US GDP to estimate constant-price GDP for these countries. This has seemed appropriate inasmuch as a large share of the GNP of these countries is realized in US dollars, in which petroleum exports generally are priced.

Advantages and Disadvantages

WMEAT's method of generating current- and constant-dollar values for GDP, CGE and military spending excludes, by design, effects of exchange rate fluctuation over the 11-year-period covered, other than such fluctuation as is necessary and sufficient to offset the difference in aggregate price inflation between the U.S. and any other country. It thus has the advantage of avoiding distortion by exchange rate fluctuations, during the 11-year period covered, of the trends both in real (*i.e.*, aggregate-price-inflation-adjusted) values of covered variables for any given country considered in isolation and in the real relative magnitudes of covered variables across different countries. It does this without resort to moving averages that might obscure real year-to-year changes.

However, this method improves the integrity of trend analysis at the cost of increasing the risk of under- or overstating the mean relative magnitude of the GDP, CGE or military expenditures of different countries for the whole 11-year period covered by a WMEAT edition, or for any covered period longer than one year. A single base-year's exchange rate fluctuation makes the GDP, CGE and military expenditures of a given country, relative to any other country, appear larger or smaller for all 11 years covered – generally by an amount not fully determined by price inflation differentials, which exchange rate movement tends to offset only in the long run. Consequently, WMEAT's

method increases the risk of error in cross-country comparisons of multi-year averages of these values, relative to the conventional approach of obtaining a current-dollar value for each year by converting at the market exchange rate for that year.[25] Conversely, one cannot, by multi-year averaging of annual WMEAT values, lessen this increased risk of distortion, due to base-year exchange rate fluctuation, of the relative magnitude values of GDP, CGE or military expenditure for different countries. WMEAT's evaluation of these variables irreducibly increases risk of error in comparative static analysis in order to improve dynamic analysis.[26]

A second disadvantage of this method is that value of a country's GDP, CGE and military expenditure for any given year varies across editions of WMEAT in "current" and "constant" dollar terms, even if it remains constant in national-currency terms, because the base-year exchange rate changes with each edition. No time series of comparable values for the GDP, CGE or military expenditure of a country or group of countries for a period of more than 11 years can be generated simply by combining the values found in different editions of WMEAT. However, this disadvantage is mitigated by the fact that a series, for a period longer than 11 years, of "constant dollar" values that are comparable *for trend-analysis purposes* can readily be generated by readers from multiple editions of WMEAT. This can be done by simple re-basing that requires knowledge only of BEA's U.S. GDP deflator over the period. [27] For example, from Table I of *WMEAT 1999-2000*, which covered the years 1989-99, and of *WMEAT 2005*, which covers the years 1995-2005, one can readily construct a series of WMEAT "constant dollar" values from 1989 to 2005. Since U.S. aggregate prices as measured by the U.S. GDP deflator were in 1999 only 86.58% of what they were in 2005, one can generate a series of 1989-2005 "constant dollar" values, in which 2005 is the base year for the whole series, simply by dividing *WMEAT 1999-2000*'s values for 1989-1994 by 0.8658. [28]

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[25] Single-year data necessarily fluctuate from year to year with greater variance than do their multi-year averages; this is why multi-year averages smooth annual data fluctuations. Hence annual exchange rate movements fluctuate around a long-term mean determined by price inflation rate differentials with greater variance from year to year than do their multi-year averages. – For a discussion of the effect of base-year exchange rate changes on inter-country comparisons and group averages, see *WMEAT 1988*, pp. 135-136.

[26] The increase in cross-country comparison error induced by WMEAT's approach might be eliminated, without loss of accuracy in trend analysis, by using the 6th of the 11 years covered in a WMEAT edition as the base year, and using the11-year average of market exchange rates as the "base year rate" from which "real" inflation-differential-offsetting conversion rates for earlier and later years are reckoned. However, this would not be possible for countries for which data for all 11 years is not available, including newly independent countries.

[27] However, the risk of error in estimating market values increases with time from the base year; if market exchange rate (MER) movements are log-normally distributed around a mean of price inflation differentials, then inflation-offsetting conversion rates reckoned from a base-year MER are better predictors of market exchange rates for years closer to the exchange rate. Rebasing to a more distant year, by discarding information, increases risk of error in comparing market values across countries.

[28] To facilitate reconversion to other constant-dollar bases if desired, the U.S. GDP deflator index, rebased here to 2005=100, is as follows:

1995	81.49	2000	88.47

Deflators used to generate constant dollar values

In previous editions of WMEAT, values for all variables expressed in constant dollar terms were generated by applying the U.S. GDP deflator. However, in this edition of WMEAT, values for total trade are expressed in constant dollar terms (in Main Statistical Table II) using the U.S. consumer price index, whereas values for arms transfers are expressed in constant dollars terms (in Tables II and IV) using the "non-pay defense sector deflator" published in a recent edition of the National Defense Budget Estimates (aka "the Green Book") published annually by the Office of the Comptroller of the U.S. Department of Defense.

However, values not only for GDP and CGE but also for military expenditures continue to be expressed in constant dollar terms (in Table I) using the U.S. GDP deflator. Constant dollar values for military expenditures are not derived by applying the Green Book's price deflator for the whole U.S. defense sector (including pay) chiefly because unavailability of a defense-sector-specific price deflator for most foreign countries renders it impossible to convert military expenditures to U.S. dollars at a defense-sector-specific "real" rate that offsets defense-sector-specific price inflation differences between the U.S. and another country.

In Table II, due to use of different deflators for total trade and arms transfers, arms imports as percentage of total imports, arms exports as a percentage of total exports, and arms trade balances as a percentage of total trade balances, expressed in constant dollar terms, may differ from comparable percentages expressed in current dollar terms. Furthermore, due to use of different deflators for military expenditures and arms transfers, any comparisons between military spending and arms transfer values given by this edition of WMEAT should be based on values expressed in current- rather than constant-dollar terms.

Indicators of extraordinary uncertainty

In the Main Statistical Tables, the symbol "**E**" indicates estimates, figures that seem uncommonly uncertain. The symbol "**R**" indicates rough estimates that seem still more uncertain: these estimates are based on scant information and are subject to a wide range of error. The symbol "N**A**," appearing instead of a value or estimate, indicates an estimate so egregiously uncertain that it seems not to warrant publication.

1996	83.03	2001	90.59
1997	84.41	2002	92.17
1998	85.35	2003	94.14
1999	86.58	2004	96.84

However, whether a highly uncertain estimate warrants publication, that is, whether it is assigned an "R" or an "NA," may depend not only on perceived uncertainty (an information-quality consideration), but also upon international military importance (an information-demand consideration). For example, if North Korea's military were not widely perceived as threatening other countries, estimates of its GDP and military expenditures might be assigned "NA" rather than "R," as are those for Burma, Haiti and Somalia; the quality of available information about GDP and military expenditures is no better for North Korea than for any of those countries.

An estimate is made of every variable covered for every country covered in every year covered, even if an "NA" is published instead of that estimate; such estimates for all countries covered by the report are included in the aggregates for regional and per capita income groups of countries even if not published separately.

Rates of change

In this edition of WMEAT, unlike previous editions, the percentage changes shown in Tables 1-5 of the Highlights are for the whole period covered by the report (the decade from 1995 to 2005), rather than average annual rates over that period.[29]

Omission of Main Statistical Table V and new features in Tables II and IV

Previous recent editions of WMEAT have included a Main Statistical Table V, titled "Number of Major Weapons Delivered to Regions and Groups, By Supplier and Weapon Type, Cumulative by [three-year] Period." Due to unavailability of suitable data for recent years, this edition of WMEAT includes no such table. Lack of suitable data seems likely to preclude inclusion of Table V in future editions of WMEAT as well.[30]

On the other hand, this edition of WMEAT innovates, in Main Statistical Table II, presentation of: the arms trade balances of countries and groups of countries as a percentage of their total trade balances; arms export/import ratios (by value) for geographic and economic groupings of countries; and the arms imports and exports of geographic and economic groupings of countries as shares of the world arms trade (by value). This edition of WMEAT also innovates, in Main Statistical Table IV, presentation of the value of arms transfer deliveries of major arms exporting countries in terms of supplier-country market shares for the world and for geographic and regional groupings of countries.

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[29] *Caveat*: To convert decade percentage changes into average annual rates of change, it is not sufficient to divide the former by ten; either continuous or periodic compounding is required, as when calculating average percentage rates of interest on a loan to be repaid with interest in a single lump sum upon maturity.

[30] However, for some although not all countries, data similar to that previously presented in Table V of WMEAT continue to be presented in the "Conventional Arms Transfers to Developing Nations" (CATDN) report produced annually by the Congressional Research Service (CRS), referenced in note 14, above.